CLAIMS

What is claimed is:

1. A method for analyzing time-tagged data associated with mail or paper processing comprising:

(a) reading a plurality of time-tagged data items received from a plurality of machines associated with an industrial process, each data item including a time-tag portion and an event portion, the time-tag portion indicating a time of occurrence of an event associated with the industrial process and the event portion indicating the event;

(b) parsing the time-tagged data items to identify data items and produce output associated with an event of interest; and

(c) computing statistical measures from the output.

2. The method of claim 1 wherein reading a plurality of time-tagged data items includes accessing a log file containing the time-tagged data items.

3. The method of claim 1 comprising receiving a plurality of time-tagged data items in real time and wherein reading a plurality of time-tagged data items includes receiving the time-tagged data items in real time.

4. The method of claim 1, wherein parsing the time-tagged data items includes applying at least one state machine to the time-tagged data items for identifying time-tagged data items relating to an event of interest and producing output relating to the event of interest.

5. The method of claim 1, wherein parsing the time-tagged data items includes applying first and second state machines to the time-tagged

data items, the first state machine producing a first output and communicating the first output to the second state machine, the second state machine producing a second output based on the time-tagged data items and the first output from the first state machine.

6. The method of claim 1 further comprising comparing computed statistical measures with reference values associated with the industrial process and alerting the user when a predetermined relationship exists between the statistical measures and the reference values.

7. The method of claim 1 further comprising simultaneously displaying, on a computer display device, process parameter values determined from the time-tagged data and reference values for the process parameter values.

8. A method for analyzing time-tagged data associated with mail or paper processing comprising:

(a) reading a plurality of time-tagged data items received from a plurality of machines associated with an industrial process, each data item including a time-tagged portion and an event portion, the time-tagged portion indicating a time of occurrence of an event associated with the industrial process, the event portion indicating the event;

(b) parsing the time-tagged data items to identify data items and produce output associated with an event of interest, wherein parsing the time-tagged data items includes applying first and second state machines to the time-tagged data items, the first

state machine producing a first output and communicating the first output to the second state machine, the second state machine producing a second output based on the time-tagged data items and the first output from the first state machine; and

(c) computing statistical measures from the output produced by the second state machine.

9. A method for identifying overlapped pages in an overlap portion of a turnover sequencer in a paper processing system, the method comprising:

(a) reading a plurality of time-tagged data entries from a plurality of machines in a mail or paper processing system;

(b) in a first state, applying a pattern matching algorithm to each time-tagged data entry for identifying a lead edge of a sheet of paper at an inside entry photocell or an outside entry photocell of the turnover sequencer;

(c) in response to detecting a sheet of paper at the inside entry photocell, transitioning to a second state for detecting a sheet of paper at the outside entry photocell; and

(d) in the second state, in response to detecting a sheet of paper at the outside entry photocell, transitioning to a third state for producing output indicating the presence of overlapped pages in the turnover area of the turnover sequencer.

10. The method of claim 9 comprising:

(e) in the first state, in response to detecting a sheet of paper at the outside entry photocell, transitioning to a fourth state for detecting a sheet of paper at the inside entry photocell; and

(f) in the fourth state, in response to detecting a sheet of paper at the inside entry photocell, transitioning to the third state for producing the output.

11. The method of claim 9, comprising, in the third state, communicating the output from a first state machine monitoring data output from one section of the turnover sequencer to a second state machine monitoring data output from another section of the turnover sequencer.

12. The method of claim 9, comprising, after producing the output, returning to the first state.

13. A method for identifying overlapped pages in an overlap portion of a turnover sequencer in a paper processing system, the method comprising:

(a) reading a plurality of time-tagged data entries from a plurality of machines in a mail or paper processing system;

(b) in a first state, applying a pattern matching algorithm to each time-tagged data entry for identifying a lead edge of a sheet of paper at an inside entry photocell or an outside entry photocell of the turnover sequencer;

(c) in response to detecting a sheet of paper at the inside entry photocell, transitioning to a second state for detecting a sheet of paper at the outside entry photocell;

(d) in the second state, in response to detecting a sheet of paper at the outside entry photocell, transitioning to a third state for producing output indicating the presence of overlap pages in the turnover area of the turnover sequencer;

(e) in the first state, in response to detecting a sheet of paper at the outside entry photocell, transitioning to a fourth state for detecting a sheet of paper at the inside entry photocell; and

(f) in the fourth state, in response to detecting a sheet of paper at the inside entry photocell, transitioning to a third state for producing the output.

14. In a computer system having a graphical user interface including a display and a user input device, a method for displaying statistical measures for selected parameter values produced from analysis of time-tagged data from a mail or paper processing system, the method comprising:

(a) displaying, on the display, a first window including parameter descriptions for mail or paper processing parameter values and status information indicating the results of comparing the parameter values to reference values;

(b) displaying, on the display, a second window including a table of statistical measures for a selected parameter description in the first window;

(c) displaying, on the display, a third window including a graph of measured values for the selected parameter description; and

(d) receiving input from a user for selecting the parameter description.

15. The method of claim 14, wherein the graph is a histogram of measured values for the selected parameter description.

16. The method of claim 14 wherein the graph is a histogram of measured values and reference values for the selected parameter description.

17. The method of claim 14 comprising receiving input from the user for printing a report including the statistical measures for the selected parameter description.

18. In a computer system having a graphical user interface including a display and a user input device, a method for displaying statistical measures for selected parameters produced from analysis of time-tagged data from a mail or paper processing system, the method comprising:

(a) displaying, on the display, a first window including parameter descriptions for mail or paper processing values and status information indicating results of comparing the parameter values to reference values;

(b) displaying, on the display, a second window including a table a statistical measures for a selected parameter description in the first window;

(c) displaying, on the display, a third window including a graph of measured values for the selected parameter description; and

(d) receiving input from the user for selecting the parameter description, and in response to receiving the input from the user,

displaying, in the second window, a table of statistical measures for the selected parameter description and displaying, in the third window, a graph of measured values for the selected parameter description.

19. The method of claim18 comprising simultaneously displaying, in the second window, reference statistical values for the selected parameter description and statistical measures for the selected parameter description.

20. A parser for analyzing time-tagged data associated with mail or paper processing, the parser comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a) reading data items associated with an industrial process, the data items each including a time tag portion indicating a time and an event portion indicating an event; and

(b) applying at least one state machine to the data items to produce output indicative of a mail or paper processing event.

21. The parser of claim 20 wherein applying the state machine to the data items includes identifying starting events and ending events associated with mail or paper processing events.

22. The parser of claim 21 wherein the starting events are detections of lead edges of sheets of paper passing a sensor in a paper processing system and the ending events are detections of trail edges of the sheets of paper passing the sensor.

23. The parser of claim 22 further comprising computing transit times for the sheets of paper passing the sensor based on time tags associated with the starting and ending events.

24. The parser of claim 23 comprising computing transit speeds for the sheets of paper passing the sensor based on the transit times, page lengths of the sheets of paper, and active area of the photocell.

25. The parser of claim 20, wherein applying at least one state machine to the data items includes applying an overlap detection state machine for detecting overlapped pages in a turnover sequencer of a paper processing system.

26. The parser of claim 25 including determining the amount of overlap for the overlapped pages.

27. A method for analyzing data associated with a mail or paper processing operation comprising:

(a) reading data associated with the mail or paper processing operation to obtain parameter values for a parameter or parameters of interest associated with the mail or paper processing operation;

(b) computing statistical measures for the parameter values; and

(c) outputting the statistical measures in a manner that facilitates interpretation of the data.

28. The method of claim 27 wherein reading data includes reading entries in a log file associated with the mail or paper processing operation and storing parameter values for the parameter of interest.

29. The method of claim 27 wherein reading data includes receiving parameter values in real time and storing parameter values associated with a parameter of interest in real time.

30. The method of claim 27 wherein outputting the statistical measures includes simultaneously displaying the statistical measures and reference values for the statistical measures on a computer display device.

31. The method of claim 27 wherein outputting the statistical measures includes displaying, on a computer display device, a first window including parameter descriptions and a second window for displaying statistical measures of parameter values for a selected parameter description.

32. The method of claim 27 comprising displaying a window including a graph for simultaneously displaying measured parameter values and reference parameter values associated with the mail or paper processing operation.